

## The Federal Reserve and Central Banking

The Federal Reserve System is the central bank of the United States. A central bank is an institution that oversees and regulates the banking system and controls the money supply. The Federal Reserve System (known as "the Fed") is made up of 12 privately owned District Federal Reserve Banks and a federal government agency that oversees the system, called the Board of Governors. The Fed has four basic functions:

1. Provide financial services for commercial banks (like holding reserves, providing cash, and clearing checks)
2. Supervise and regulate banking institutions to ensure the safety and soundness of the nation's banking and financial system
3. Maintain stability of the financial system by providing liquidity to financial institutions in order to maintain their safety and soundness
4. Conduct monetary policy to prevent or address extreme fluctuations in the economy

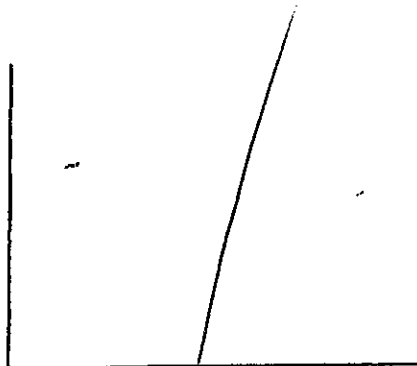
The Fed's goal is "to promote effectively the goals of maximum employment, stable prices and moderate long-term interest rates." A primary goal of the Fed is to stabilize prices, which is arguably the strongest contribution the Fed can make to promoting economic growth. Over time, it has become evident that monetary policy's long-term influence over prices is strong but its influence over real output and real interest rates is mostly short term.

To promote employment and price stability, the Fed can use monetary policy to raise or lower interest rates through the money market. Lower interest rates promote spending and investment that leads to increased employment (this is called *expansionary* monetary policy). Higher interest rates prevent inflation and promote price stability (this is called *contractionary* monetary policy).

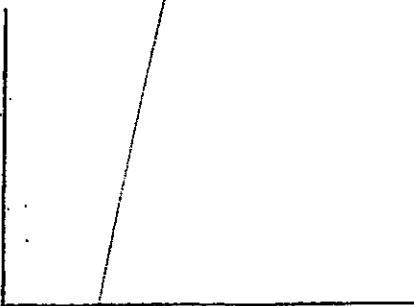
The Fed has three main policy tools it can use to control equilibrium interest rates in the money market: the reserve requirement, the discount rate, and open-market operations.

1. **The reserve requirement.** The Fed sets the percentages of bank deposits that must be held as reserves. Greater excess reserves lead banks to expand credit, which expands the money supply. Fewer excess reserves lead banks to reduce credit, which decreases the money supply. Changes in the money supply change equilibrium interest rates in the money market. Because changes in the reserve requirement can have powerful impacts, the reserve requirement is seldom used as a tool of monetary policy.
2. **The discount rate.** The discount rate is the rate that commercial banks must pay to borrow from the Fed. When it is cheaper to borrow from the Fed, banks will borrow more reserves; when it is more expensive to borrow from the Fed, banks will borrow less. More reserves lead banks to expand credit, which expands the money supply. Fewer reserves lead banks to reduce credit, which reduces the money supply. The discount rate is set by the Fed, generally a percentage point above the *federal funds rate* (which is the interest rate banks charge each other for overnight loans).

(D) The University of Michigan releases the index of consumer and business confidence, which indicates both are lower.



(E) Consumers in China decide to increase consumption.



The equilibrium federal funds rate established in the money market is the focus of monetary policy, not the discount rate set directly by the Fed.

3. **Open market operations (OMOs).** OMOs refers to the Fed buying and selling U.S. Treasury bills, normally through a transaction with commercial banks that changes the banks' reserves. When the Fed buys Treasury bills, it increases the banks' reserves, and when the Fed sells Treasury bills, it decreases the banks' reserves. The change in the banks' reserves leads to a change in the money supply. Changes in the money supply change equilibrium interest rates in the money market. OMOs are the most frequently used monetary policy tool.

**Student Alert:** Open market operations include buying and selling government bonds. When you are asked about an open market operation, you should answer in terms of buying bonds or selling bonds.

### The Mechanics of Monetary Policy

To manage the money supply, the Fed uses the tools of monetary policy to influence the quantity of reserves in the banking system. The following examples use T-accounts to show how the Fed could use open market operations to increase the money supply by \$100.

Figure 4-6.1 shows T-accounts for the economy. The required reserve ratio is 10 percent. The bank holds \$26 in reserve accounts and \$4 in Federal Reserve notes (vault cash). Total bank reserves equal \$30, so total reserves equal required reserves and there are no excess reserves. Net worth = assets – liabilities.



Figure 4-6.1

#### T-Accounts

Assets		Liabilities	
The Fed			
Treasury securities	\$83	\$26	Reserve accounts of banks
		\$57	Federal Reserve notes
Banks			
Reserve accounts	\$26	\$300	Checkable deposits
Federal Reserve notes	\$4		
Loans	\$405	\$135	Net worth (to stockholders)
Bank customers			
Checkable deposits	\$300	\$405	Loans
Federal Reserve notes	\$53		
Treasury securities	\$52		
Money supply = \$353 (\$300 + \$53)			

## Expansionary Policy via Open Market Purchases

Now suppose the Fed believes the economy is heading into a recession and wishes to increase the money supply by \$100, so it uses open market operations and purchases \$10 worth of Treasury securities from the public.

Figure 4-6.2 shows the T-accounts after the effects of the Fed action work their way through the economy. Compare Figure 4-6.1 with Figure 4-6.2. The Fed's \$10 increase in reserve accounts yields a \$100 increase in the money supply.



Figure 4-6.2

### T-Accounts after \$10 Open Market Purchase

Assets		Liabilities	
The Fed			
Treasury securities (+\$10)	\$93	\$36	Reserve accounts of banks (+\$10)
		\$57	Federal Reserve notes
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Banks			
Reserve accounts (+\$10)	\$36	\$400	Checkable deposits (+\$100)
Federal Reserve notes	\$4		
Loans (+\$90)	\$495	\$135	Net worth (to stockholders)
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Bank customers			
Checkable deposits (+\$100)	\$400	\$495	Loans (+\$90)
Federal Reserve notes	\$53		
Treasury securities (-\$10)	\$42		
Money supply = \$453 (\$400 + \$53)			

For the following questions, start with the T-accounts in Figure 4-6.1. Suppose the Fed wishes to *decrease* the money supply from \$353 to \$303 by open market operations. The reserve requirement is 10 percent.

1. Will the Fed want to buy or sell existing Treasury securities? \_\_\_\_\_
2. What is the money multiplier? \_\_\_\_\_
3. What is the value of Treasury securities that need to be bought or sold? \_\_\_\_\_

4. Fill in Figure 4-6.3 to show the accounts after open market operations are finished and all changes have worked their way through the economy.



Figure 4-6.3

**T-Accounts after Open Market Operations Are Finished**

Assets		Liabilities	
		The Fed	
Treasury securities			Reserve accounts of banks
		\$57	Federal Reserve notes
		Banks	
Reserve accounts			Checkable deposits
Federal Reserve notes			
Loans		\$135	Net worth (to stockholders)
		Bank customers	
Checkable deposits			Loans
Federal Reserve notes	\$53		
Treasury securities			
Money supply =			

For the following questions, suppose banks keep zero excess reserves and the reserve requirement is 15 percent.

5. What is the deposit expansion multiplier? \_\_\_\_\_
6. A customer deposits \$100,000 in a checking account.
- (A) How much must the bank add to its reserves? \_\_\_\_\_
- (B) How much of this can the bank lend to new customers? \_\_\_\_\_
- (C) In what two forms can a bank hold the new required reserves? \_\_\_\_\_

7. Suppose that the \$100,000 had previously been held in Federal Reserve notes under the customer's mattress and that banks continue to hold no excess reserves. By how much will the customer's deposit cause the money supply to grow? \_\_\_\_\_
8. Circle the correct symbol in Table 4-6.1.



Table 4-6.1

**Fed Actions and Their Effects**

Federal Reserve action	Bank reserves	Money supply	Fed funds rate
(A) Sold Treasury securities on the open market	↑ ↓	↑ ↓	↑ ↓
(B) Bought Treasury securities on the open market	↑ ↓	↑ ↓	↑ ↓
(C) Raised the discount rate	↑ ↓	↑ ↓	↑ ↓
(D) Lowered the discount rate	↑ ↓	↑ ↓	↑ ↓
(E) Raised the reserve requirement	↑ ↓	↑ ↓	↑ ↓
(F) Lowered the reserve requirement	↑ ↓	↑ ↓	↑ ↓

9. In Table 4-6.2, indicate how the Fed could use each of the three monetary policy tools to pursue an expansionary policy and a contractionary policy.



Table 4-6.2

**Tools of Monetary Policy**

Monetary policy	Expansionary policy	Contractionary policy
(A) Open market operations		
(B) Discount rate		
(C) Reserve requirements		

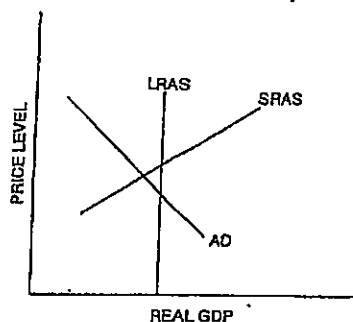
## Monetary Policy

Monetary policy is the action of the Federal Reserve (the Fed) to prevent or address extreme economic fluctuations. The Fed uses its monetary policy tools to influence equilibrium interest rates in the money market through its control of bank reserves. The Fed lowers interest rates through expansionary monetary policy to prevent or address recessions, and it raises interest rates through contractionary monetary policy to prevent or address inflation. Monetary policy is transmitted to the economy through changes in aggregate demand. Monetary policy will have both short-run and long-run effects in the economy. In the following figures, long-run aggregate supply, short-run aggregate supply, and demand curves are represented by LRAS, SRAS, and AD.



Figure 4-7.1

### Effects of Monetary Policy in the Economy (Recession)



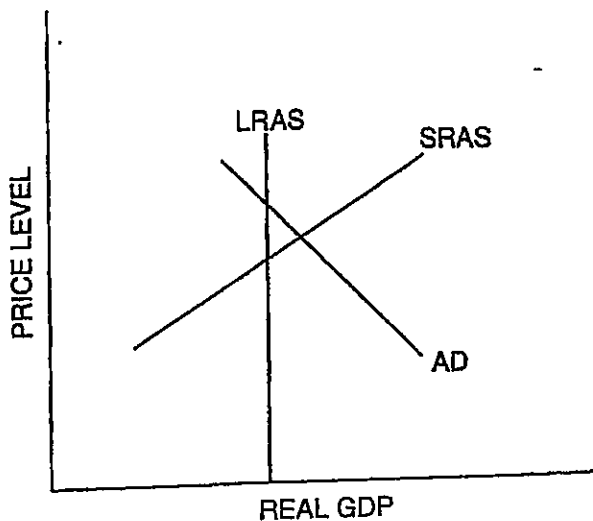
1. Suppose that initially the economy is at the intersection of AD and SRAS in Figure 4-7.1.
  - (A) What monetary policy can the Fed implement to move the economy to full-employment?
  - (B) If the Fed is going to use open market operations, it should (*buy / sell*) Treasury securities.
  - (C) The effect will (*increase / decrease*) Treasury security (bond) prices.
  - (D) In the short run, what is the effect on nominal interest rates? Explain.
  - (E) In the short run, what happens to real output? Shift the curve on the graph to show how the Fed's action results in a change in real output and explain why the shift occurs.
  - (F) In the short run, what happens to the price level? Explain how the Fed's action results in a change to the price level.







Figure 4-7.2  
Effects of Monetary Policy in the Economy (Inflation)



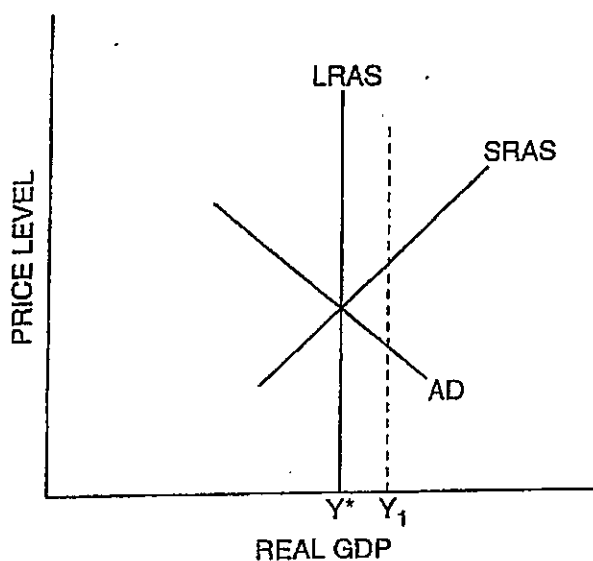
2. Suppose that initially the economy is at the intersection of AD and SRAS in Figure 4-7.2.
- (A) What monetary policy can the Fed implement to move the economy to full-employment?
  - (B) If the Fed is going to use open market operations, it should (*buy / sell*) Treasury securities.
  - (C) The effect will (*increase / decrease*) Treasury security (bond) prices.
  - (D) In the short run, what is the effect on nominal interest rates? Explain.
  - (E) In the short run, what happens to real output? Shift the curve on the graph to show how the Fed's action results in a change in real output and explain why the shift occurs.
  - (F) In the short run, what happens to the price level? Explain how the Fed's action results in a change to the price level.

3. In the situation shown in Figure 4-7.3, suppose that the monetary authorities decide to maintain the level of employment represented by the output level  $Y_1$  by using expansionary monetary policy.



Figure 4-7.3

## Monetary Policy in the Long Run



- (A) Explain the effect of the expansionary monetary policy on the price level and output in the short run.
- (B) Explain the effect on the price level and output in the long run.
- (C) Explain what you think will happen to the nominal rate of interest and the real rate of interest in the short run as the Fed continues to increase the money supply. Explain why.
- (D) Explain what you think will happen to the nominal rate of interest and the real rate of interest in the long run. Explain why.

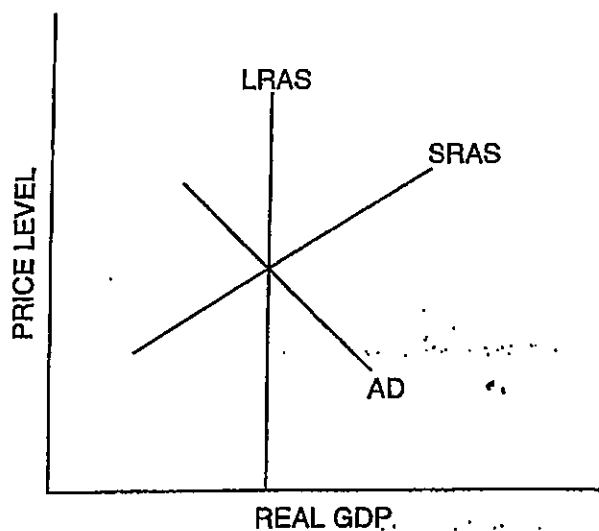
4. Many economists think that moving from short-run equilibrium to long-run equilibrium may take several years. List three reasons why the economy might not immediately move to long-run equilibrium.

5. Briefly summarize the long-run impact of an expansionary monetary policy on the economy.



Figure 4-7.4

### Expansionary Monetary Policy



6. Suppose that initially the economy is at the intersection of AD and SRAS as shown in Figure 4-7.4. Now, the Fed decides to implement expansionary monetary policy to increase the level of employment.

(A) In the short run, what happens to real output? Explain why.

(B) In the short run, what happens to the price level? Explain why.



## 4 Macroeconomics

### ACTIVITY 4-7 (CONTINUED)

(C) In the short run, what happens to employment and nominal wages? Explain why.

(D) In the short run, what happens to nominal interest rates and real interest rates?

(E) In the long run, what happens to real output? Explain why.

(F) In the long run, what happens to the price level? Explain why.

(G) In the long run, what happens to employment and nominal wages? Explain why.

(H) In the long run, what happens to the nominal interest rate and the real interest rate?